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Filed : June 12, 2006

REMARKS

Claim 1 has been withdrawn from consideration as being directed to a non-elected invention. Claims 2 and 10 have been amended to clarify subject matter. Support can be found at page 6, line 30-34, and Fig. 7, for example. Claims 2, 4 and 6 have been amended to clarify the limitations “its core cords” and “its back layer”. No new matter has been added. Applicant respectfully requests entry of the amendments and reconsideration of the application in view of the amendments and the following remarks.

Claim Objections

Claim 2 has been objected to because the limitation “the angle of helical teeth” lacks sufficient antecedent basis. Claim 2 has been amended to change “the angle” to “an angle”, thereby obviating this objection.

Rejections of Claims 2-9 Under 35 U.S.C. § 112

Claims 2-9 have been rejected under 35 U.S.C. § 112, second paragraph, with regard to the limitations “its core cords” and “its back layer” in claims 2, 4, and 6 wherein the pronoun “its” renders the claim indefinite. Claims 2, 4, and 6 have been amended to clarify the limitations, thereby obviating this rejection.

Rejections of Claims 2-3, 5, and 7 Under 35 U.S.C. § 103

Claims 2-3, 5, and 7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Ueda et al (“Noise and Life of Helical Timing Belt Drives”) in view of Nakanishi (US 5,346,731).

The Examiner states that although Ueda et al fails to disclose the core cords twisted at an angle opposing to the angle of the helical teeth and having a core cord twist angle of 2° to 15° or 4.8° to 10.2°, Nakanishi discloses a belt (A) in which a cord (7) is twisted at an angle of 10° (Col. 2, Ln. 53-57). However, in Nakanishi, the reinforcement 2 “is constructed by a plurality of tubular braids 7 braided by more than three yarns 6 of (four yarns in the present embodiment) at braid angle (α) of 10°-35°” (Col. 2, Ln. 50-55). As shown in Fig. 2 of Nakanishi, the braids braided by more than three yarns are structurally different from the “core cords, substantially all of which are twisted in a single direction” as defined in claim 2. Further, in Nakanishi, “a canvas layer 5 is adhered on a surface of teeth 3 of the belt base 4” (Col. 2, Ln. 48-49). As described at page 6,

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lines 11-15 of the instant specification, when a canvas is used, the canvas contact the pulley and does not resists thrust force. Therefore, Nakanishi does not teach or suggest the “core cords, substantially all of which are twisted in a single direction … wherein a surface between the helical teeth has irregularities created by the twisting of the core cords and configured to contact tops of pulley teeth” as defined in claim 2. Because Nakanishi uses the braids and the canvas, they do not resist thrust force and do not generate friction and resistance against sliding. The instant specification states:

The inventor considered that the surface irregularities created by the twisting of the core cords would contact the tops of pulley teeth, thereby generating friction and resistance against sliding. These surface irregularities also change the friction resistance, because the contact angle and length of each core cord comprising a twine are determined by the direction and density of twist.

The present invention paid attention to the fact that the contact angle and length of cords are dependent on the core cord twist angle, and thereby developed, and provides, a helical synchronous belt that resists thrust force.

Specification at page 6, line 30 to page 7, line 3. Table 1 on page 8 shows that when the twist angle is in the range of 2° to 15° (4.8° to 10.2°), the durability is significantly increased.

The Examiner also states: “It would have been an obvious matter of design choice to include the core cords are twisted at an angle opposing to the angle of the helical teeth, since it would have been well known in the art to have the force vectors of the cords opposing the force vectors of the helical teeth in order to increase life of the belt.” *Office Action* at page 4, lines 12-16. However, the Examiner does not provide any support for the statement. Nakanishi shows the braids, and the braid angle has two directions (one is opposing to and the other is not opposing to the angle of the helical teeth). Further, as described in the instant specification, conventional belts have core cords made of both left- and right-handed twists wound together (page 6, lines 20-24), i.e., one is opposing to and the other is not opposing to the angle of the helical teeth. No prior art shows the “core cords, substantially all of which are twisted in a single direction at an angle opposing to an angle of helical teeth” as defined in claim 2.

In view of the above, Nakanishi does not teach or suggest, in any predictable manner, the core cords in combination with the other elements as defined in claim 2. Ueda et al does not supply the deficiencies of Nakanishi. Therefore, claim 2 could not be obvious over Ueda et al and Nakanishi. Applicant’s examples (e.g. Table 1 on page 8) are consistent with this

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determination. Claims 3, 5, and 7 also could not be obvious over Ueda et al and Nakanishi at least due to their dependencies upon claim 2.

Applicant respectfully requests withdrawal of the rejections.

Rejections of Claims 4, 6, and 8-9 Under 35 U.S.C. § 103

Claims 4, 6, and 8-9 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Ueda et al (“Noise and Life of Helical Timing Belt Drives”) and Nakanishi (US 5,346,731) and further in view of Fujita (US 6,216,853).

As discussed above in relation to claim 2, claim 2 could not be obvious over Ueda et al and Nakanishi. Fujita does not teach a helical synchronous belt or core cords. Fujita does not supply the deficiencies of Ueda et al and Nakanishi, and therefore, claim 2 could not be obvious over Ueda et al, Nakanishi, and Fujita in any combination. Claims 4, 6, and 8-9 also could not be obvious over Ueda et al, Nakanishi, and Fujita at least due to their dependencies upon claim 2.

Applicant respectfully requests withdrawal of the rejections.

Rejections of Claims 10 and 13 Under 35 U.S.C. § 103

Claims 10 and 13 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilson et al (US 7,008,341) in view of Nakanishi (US 5,346,731) and further in view of Ueda et al (“Noise and Life of Helical Timing Belt Drives”).

Wilson et al teaches the multi-ribbed belt 10 “driven about its associated grooved pulleys due to the friction interaction between the pulley grooves and the sides of the longitudinal ribs 18” (Col. 2, Ln. 59-62). Thus, in Wilson et al, helical teeth and pulley teeth are not engaged with each other. Further, the cords 24 are deeply embedded and do not create irregularities on a surface. Thus, the features discussed above in relation to claim 2 are not taught or suggested by Wilson et al. As discussed above in relation to claim 2, claim 2 could not be obvious over Ueda et al and Nakanishi. Wilson et al does not supply the deficiencies of Ueda et al and Nakanishi, and therefore, claim 2 could not be obvious over Ueda et al, Nakanishi, and Wilson et al in any combination. Claim 10 as amended herein recites the features discussed above in relation to claim 2. Thus, claim 10 also could not be obvious over Wilson et al, Ueda et al, and Nakanishi for reasons similar to those discussed in relation to claim 2. Claim 13 could not be obvious over Wilson et al, Ueda et al, and Nakanishi at least due to its dependency upon claim 10.

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Applicant respectfully requests withdrawal of the rejections.

Rejection of Claim 11 Under 35 U.S.C. § 103

Claim 11 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilson et al (US 7,008,341) in view of Nakanishi (US 5,346,731) and further in view of Ueda et al (“Noise and Life of Helical Timing Belt Drives”).

As discussed above, claim 10 could not be obvious over Wilson et al, Ueda et al, and Nakanishi, and Applicant respectfully requests withdrawal of the rejection of claim 11 at least due to its dependency upon claim 10.

Rejection of Claim 12 Under 35 U.S.C. § 103

Claim 12 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Wilson et al (US 7,008,341) in view of Nakanishi (US 5,346,731) and further in view of Ueda et al (“Noise and Life of Helical Timing Belt Drives”) and Fujita (US 6,216,853).

As discussed above, claim 10 could not be obvious over Wilson et al, Ueda et al, and Nakanishi. As discussed above in relation to claims, 4, 6, and 8-9, Fujita does not supply the deficiencies of Ueda et al and Nakanishi. Thus, claim 10 could not be obvious over Wilson et al, Ueda et al, Nakanishi, and Fujita. Applicant respectfully requests withdrawal of the rejection of claim 12 at least due to its dependency upon claim 10.

CONCLUSION

In light of the Applicant's amendments to the claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. The grounds for rejection which are not discussed herein are moot and Applicants expressly do not acquiesce in the findings not separately addressed. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, the Applicants are not conceding in this

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application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. The Applicants reserve the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that the Applicants have made any disclaimers or disavowals of any subject matter supported by the present application.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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